

Role Of Iron Polymaltose Complex (Ipc) On Strength Of Powerlifters In Pakistan

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Abstract:

Aims of the Research

Aims and Objectives of this study were to check the difference in the effect of blood haemoglobin levels (g/dL) of the experimental group with the control group through Pre-test Post-test analysis and to check the difference of improvement in best powerlifting score (Kgs) of the experimental group with the control group of powerlifting players through Pre-test Post-test analysis by the supplementation of Iron Polymaltose Complex (IPC).

Methodology

Elite class male powerlifters (n=200) of age between 22 - 26 years and with body weights from 74 to 105kg (As the majority of Pakistani Powerlifters fall in these body weights) were selected from different weightlifting, powerlifting and bodybuilding clubs of Pakistan using convenience sampling. The experimental research design of pre-test, post-test (Mid-term), and post-test (Final Term) was used to measure the effect of Iron Polymaltose Complex (IPC).

Findings and Conclusion

There was significant increase in average blood hemoglobin level (2.43g/dL) (Sig. .000) of experimental group in comparison to control group with an increase in average best powerlifting score (31.70 Kgs) (Sig. .000) of powerlifters of experimental group in comparison to control group Post-Test (Mid-Term) to Post-test (Final-Term).

Study Implications

As this is the novel study i.e. first time done in Pakistan is a great source of information for Players, Coaches and Officials not only of Powerlifting but also for other strength sports for development of their strength by the use of Iron Polymaltose Complex (IPC) to perform well in their respective sports.

Keywords: Iron, Iron Polymaltose Complex, Powerlifting, Sports, Strength

I. Introduction and Literature Review:

Iron polymaltose complex is a type of iron supplement used to treat iron deficiency anemia, a condition where the body lacks sufficient red blood cells due to a lack of iron (Stein, Hartmann & Dignass, 2010). Hemoglobin is a protein in red blood

cells that carries oxygen throughout the body. Iron is an essential mineral that plays a crucial role in its production (Gupta, 2014). While iron is important for overall health, it directly contribute to the strength of the human body. Strength is also influenced by a variety of factors, including genetics, nutrition,

exercise, and lifestyle habits (Izquierdo et al., 2021). However, iron plays a role in energy production and muscle function, which can indirectly impact strength. Iron is needed for the production of adenosine triphosphate (ATP), a molecule that provides energy for muscle contractions (Soetan, Olaiya & Oyewole, 2010). Iron is also involved in the formation of myoglobin, a protein in muscle cells that stores oxygen and helps muscles function properly (Lundby, Calbet & Robach, 2009). Without adequate iron, the body may experience fatigue, weakness, and decreased endurance, which can impact overall physical performance (Thomas, Erdman & Burke, 2016). Iron polymaltose complex may be beneficial for athletes who are at risk of developing iron deficiency anemia due to the high demands that intense exercise can place on the body (Percy, Mansour & Fraser, 2017). Athletes who compete in endurance sports like triathlons, long-distance running, and cycling, are particularly susceptible to iron deficiency due to the increased production of red blood cells and loss of iron through sweat and urine (Peeling et al., 2008). Hemoglobin, a protein in red blood cells that transports oxygen to muscles, cannot be made without iron. The body may not be able to produce enough hemoglobin if it does not have enough iron, which can cause fatigue, decreased endurance, and decreased athletic performance (Williams, 2005). Supplementing with iron polymaltose complex can help restore iron levels in the body and support the production of hemoglobin (Toblli, Cao, Oliveri & Angerosa, 2012). However, it is important to note that excessive iron intake can be harmful and may lead to iron overload, which can cause organ damage (Porter, Viprakasit, & Kattamis, 2014). Athletes who are considering taking iron supplements should first consult with a healthcare provider to determine if they have iron deficiency anemia and to determine the appropriate dosage (Nieper, 2005). It is also important to ensure that they are consuming a well-balanced diet rich in iron, as well as other nutrients that are important for overall athletic performance, such as protein, carbohydrates, and electrolytes (Potgieter, 2013).

The three main lifts in powerlifting, a competitive strength sport, are: deadlift, bench press, and squat. In each of these lifts, athletes try to lift as much weight as they can, and their best lifts are added together to

get their overall score (Bengtsson, Berglund & Aasa, 2018). Athletes of all ages and skill levels compete in local, national, and international powerlifting competitions. Powerlifting is a popular sport worldwide. The International Powerlifting Federation (IPF) is the largest governing body for the sport, and it organizes world championships and other major competitions. Powerlifting is a growing sport in Pakistan, with a number of local and regional competitions held throughout the country (Han Lim, 2019). The Pakistan Powerlifting Federation (PPLF) is the governing body for the sport in Pakistan and is recognized by the International Powerlifting Federation (IPF). There are a number of powerlifting clubs and gyms in Pakistan that offer training and coaching for athletes of all skill levels. The sport has gained a following among both male and female athletes, with a number of notable powerlifters from Pakistan competing at the national and international level. In recent years, powerlifting has gained more visibility and recognition in Pakistan, with increased media coverage and support from sports organizations. The PPLF has also been working to promote the sport and provide opportunities for athletes to compete and improve their skills. Overall, powerlifting is a growing and popular sport in Pakistan, and there is a growing community of athletes and supporters who are passionate about the sport and its potential to promote health, fitness, and strength (Jahangir & Manzoor, 2019).

Iron polymaltose complex (IPC) may also be beneficial for powerlifters who are at risk of developing iron deficiency anemia due to the high demands of their training and competition (Toblli & Brignoli, 2007). Powerlifting involves lifting heavy weights, which places a significant strain on the body, including the muscles and the cardiovascular system (Storey & Smith, 2012). According to Dasa & Abera (2018), hemoglobin, a protein found in red blood cells that transports oxygen to muscles, cannot be made without iron. According to Williams (2005), the body's inability to produce sufficient hemoglobin may result in fatigue, diminished endurance, and diminished athletic performance. Supplementing with iron polymaltose complex can help restore iron levels in the body and support the production of hemoglobin, which may help powerlifters maintain their strength and endurance during training and

competition (Patil et al., 2019). However, it is important to note that excessive iron intake can be harmful and may lead to iron overload, which can cause organ damage (Eaton & Qian, 2002).

This research was conducted on Powerlifters (male) and this was the first proven information regarding the effects of Iron Polymaltose Complex (IPC) on Powerlifting Players. Powerlifters were able to lower their risk of muscle injuries, muscle wasting, and low blood hemoglobin thanks to this knowledge. Because prior knowledge of Iron's role in athlete muscle health and hemoglobin is important, this study serves as one of the selection criteria for players selected for training camps. Objectives of this study were to check the difference in the effect of blood haemoglobin levels of the experimental group with the control group through Pre-test Post-test analysis and to check the difference of improvement in lifting the best total of the experimental group with the control group of powerlifting players through Pre-test Post-test analysis by the supplementation of Iron Polymaltose Complex (IPC). Research Hypotheses developed for this study are **H1**: There will be an increase in the blood haemoglobin level of the experimental group in comparison to the control group of Powerlifting Players and **H2**: There will be an increase in the lifting best total of the experimental group in comparison to the control group for Powerlifting Players.

2. Research Methodology:

- Using convenience sampling, elite-class male powerlifters (n=200) from various Pakistani weightlifting, powerlifting, and bodybuilding clubs with body weights ranging from 74 to 105 kilograms were chosen from the majority of Pakistani powerlifters. All of the players were observed by their home coaches, and researchers paid regular weekly visits. By providing personal information, taking a blood sample orally, and signing a consent form, they gave their permission to take part in this study.
- All National level male players (provincial and departmental level) (Hinton and Sinclair, 2007; Tseng, Lee, Peng, Lin & Chen, 2021) were included in the study and players less than provincial level i.e. who have not

achieved any position at province level were excluded from the study due to their immature level of sports.

2.1 Research Design

• Blood Haemoglobin Measurement Protocol

The blood haemoglobin level (g/dL) of all players in two groups was checked using Bio Vision Abcam® Haemoglobin Assay Kit (Colorimetric) (Kit. No. ab234046) through the colorimetric detection method. The Haemoglobin Assay Kit (Colorimetric) (ab234046) is a simple and quick way to check the levels of haemoglobin in a wide range of samples. The detector selectively transforms heme into a stable chemical complex with a maximum absorption at 575 nm for this assay. The power of the variety is straightforwardly corresponding to the absolute grouping of hemoglobin in the example. The unit can distinguish as low as 0.02 g/dL hemoglobin (Wang, Li, Zhou, Wiltse and Zand, 2021).

2.2 Categorization / Grouping and Testing of Players

2.2.1 Pre-Test

- As pre-test data, lifting best total in powerlifting events (Squat + Bench-press + Deadlift) (USA Powerlifting, www.usapowerlifting.com, retrieved 2023-03-01) along with their blood haemoglobin level (g/dL) was measured and recorded.
- Blood haemoglobin level (g/dL) of all players was measured using Bio Vision Abcam® Haemoglobin Assay Kit (Colorimetric) (Kit. No. ab234046) (Wang, Li, Zhou, Wiltse & Zand, 2021) in the pre-test protocol.
- Lifting best total (Kg) of Powerlifting Events and their blood haemoglobin level (g/dL) of all players was measured in the pre-test protocol.

2.2.2 Treatment Protocol (Mid-Term)

- All players were treated with a soft gel capsule of Iron Polymaltose Complex (IPC) (Ferosoft, A product manufactured by Hilton Laboratories (Pvt.) Ltd. containing 100mg of Iron Polymaltose Complex (IPC) equal to 26mg of elemental Iron (Hinton & Sinclair, 2007) under the direction of a registered medical practitioner, a pharmacist, and other members of the paramedical staff for two months, taking one capsule daily (Hinton & Sinclair, 2007).
- A two-month Powerlifting training program was developed based on their lifting best total and applied to all players.

2.2.3 Post Test (Mid-Term)

- As post-test (Mid-Term) data, lifting best total of powerlifting events (Squat + Benchpress + Deadlift) (USA Powerlifting, www.usapowerlifting.com, retrieved 2023-03-01) along with their blood haemoglobin level (g/dL) will be recorded.
- Blood haemoglobin level (g/dL) of all players was measured using Bio Vision Abcam® Haemoglobin Assay Kit (Colorimetric) (Kit. No. ab234046) (Wang, Li, Zhou, Wiltse & Zand, 2021) in the post-test (Mid-Term) protocol.
- Lifting the best total (Kg) and blood haemoglobin level (g/dL) of all players was measured in the post-test (Mid-Term) protocol.

2.2.4 Treatment Protocol (Final-Term)

- All players were partitioned into two sub-groups as Sub-group I (100 players) and II (100 players) as experimental sub-group and control sub-group respectively where the experimental sub-group was treated with Iron Polymaltose Complex (IPC) under the direction of a registered medical practitioner, a pharmacist, and other paramedical staff, Group II received a daily dose of one capsule of a placebo for two months (Hinton & Sinclair, 2007).

- A summed up (for all players) training program for Powerlifting was designed as indicated by their lifting best aggregate and applied for two months time period.

2.2.5 Post Test (Final-Term)

- After further two months of treatment, a post-test (Final-term) of the best lifting total (Kg) of powerlifters was taken along with their blood haemoglobin level (g/dL) and recorded on data form along with a change in lifting best total, blood haemoglobin level and their percentages from Pre-test to Post-test (Mid-term) and from Post-test (mid-term) to Post-test (Final-term).

2.3 Data Analysis Technique

Paired Sample t-test was used to measure the change in their:

- Change and percentage change in best powerlifting score (Kgs) from pre-test to post-test (Mid-term) and from Post-test (Mid-term) to Post-test (Final-term) for powerlifters and compared with placebos.
- Change and percentage change in blood haemoglobin level (g/dL) from pre-test to post-test (Mid-term) and from Post-test (Mid-term) to Post-test (Final-term) for powerlifters and compared with placebos.

3. Results and Data Analysis

Researchers found an increase of 3.21g/dL (Sig. .000) in their average blood hemoglobin level (g/dL) (Table 1, Fig. 1) and best powerlifting score in their powerlifting lifting events i.e. Squat, Benchpress and Deadlift events which 37.5kg (Sig. .000) (Table 2, Fig. 2) in their first phase of supplementation of Iron Polymaltose Complex (IPC) i.e. from pre-test to post-test (mid-term) of a period of two months. Followed by Post-test (mid-term), all players were segregated in two groups as one experimental group (n=100) and one control group (n=100). Experimental group who is treated with Iron polymaltose complex (IPC) showed an increase of 2.43g/dL (Sig. .000) in their blood hemoglobin level (g/dL) (Table 1, Fig. 1) with

an increase of 31.7kg (Sig. .000) on average in their best powerlifting score (Kgs) (Table 2, Fig. 2) where control group who is treated with placebos showed a negligible decrease of 0.38 g/dL (Sig. .000) in their blood hemoglobin level (g/dL) (Table 1, Fig. 1) with a minor increase in their best powerlifting score of value 2.2kg (Sig. .000) (Table 2, Fig. 2). So, results

showed that there is positive effect of supplementation of Iron Polymaltose Complex (IPC) on best powerlifting score (Kgs) of Powerlifting Players i.e. increase in blood hemoglobin level due to supplementation of Iron Polymaltose Complex (IPC) cause an increase in best powerlifting score (Kgs) of powerlifting players

Table 1

Paired Samples Statistics for Blood Hemoglobin Level (g/dL)						
	Mean	N	SD	SEM	t	Sig.
Blood Hemoglobin Level (g/dL) in Pre-test	10.16	200	1.44533	.31556	143.45	.000
Blood Hemoglobin Level (g/dL) in Post-test (Mid-term)	13.37	200	1.75573	.46554		
Blood Hemoglobin Level (g/dL) in Post-test (Mid-term)	13.35	100	5.67823	.40151	145.76	.000
Blood Hemoglobin Level (g/dL) in Post-test (Final-term) of Experimental Group	15.80	100	4.93426	.34890		
Blood Hemoglobin Level (g/dL) in Post-test (Mid-term)	13.35	100	4.93426	.34890	142.56	.000
Blood Hemoglobin Level (g/dL) in Post-test (Final-term) of Control Group	12.97	100	5.67823	.40151		

Where $\alpha=.001$; N= Sample Population; Sig.=Significance; t=t-test value; SD=Standard Deviation; SEM=Standard Error of Mean

Table 2

Paired Samples Statistics for Best Powerlifting Score (Kgs)						
	Mean	N	SD	SEM	t	Sig.
Best Powerlifting Score (Kgs) in Pre-test	640.50	200	5.67823	.40151	187.12	.000
Best Powerlifting Score (Kgs) in Post-test (Mid-term)	677.50	200	4.97556	.35183		
Best Powerlifting Score (Kgs) in Post-test (Mid-term)	675.00	100	5.67823	.40151	196.45	.000
Best Powerlifting Score (Kgs) in Post-test (Final-term) of Experimental Group	706.70	100	4.93426	.34890		
Best Powerlifting Score (Kgs) in Post-test (Mid-term)	675.00	100	4.93426	.34890	191.78	.000
Best Powerlifting Score (Kgs) in Post-test (Final-term) of Control Group	677.20	100	5.67823	.40151		

Where $\alpha=.001$; N= Sample Population; Sig.=Significance; t=t-test value; SD=Standard Deviation; SEM=Standard Error of Mean

Figure 1

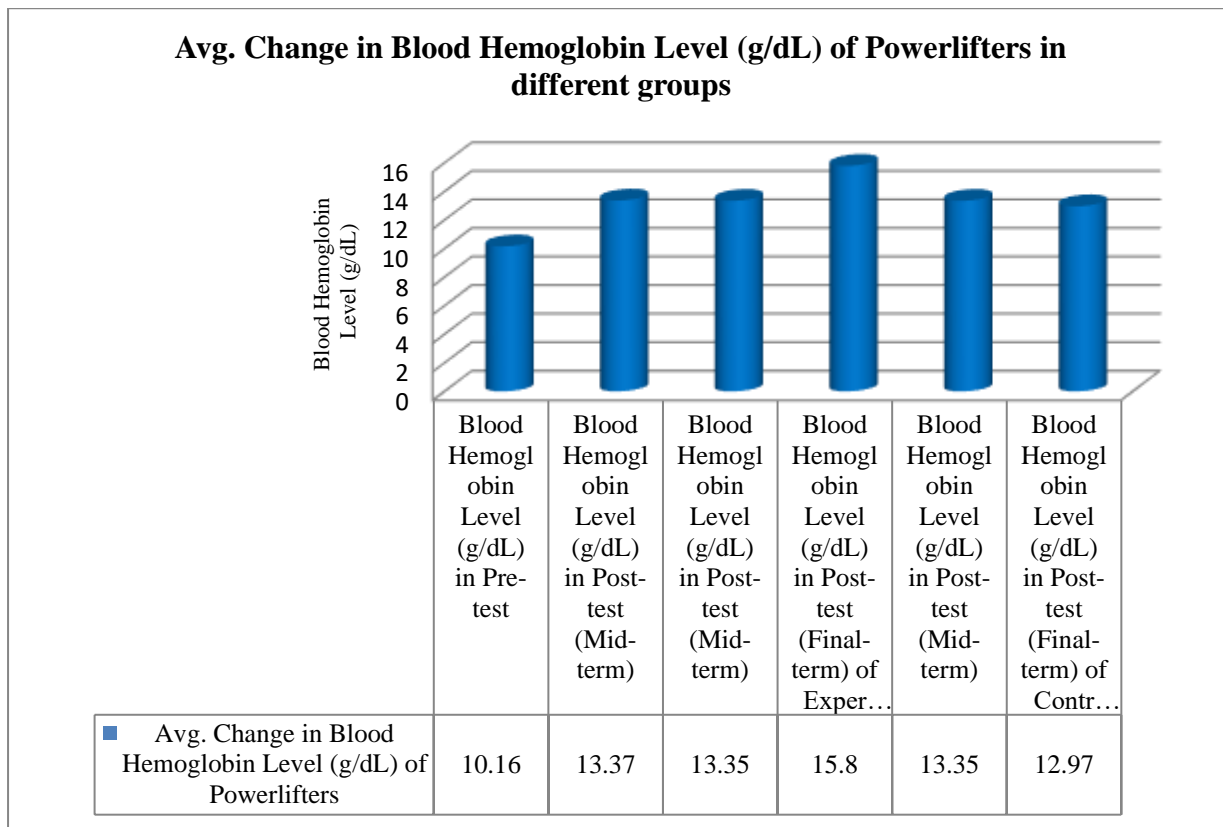
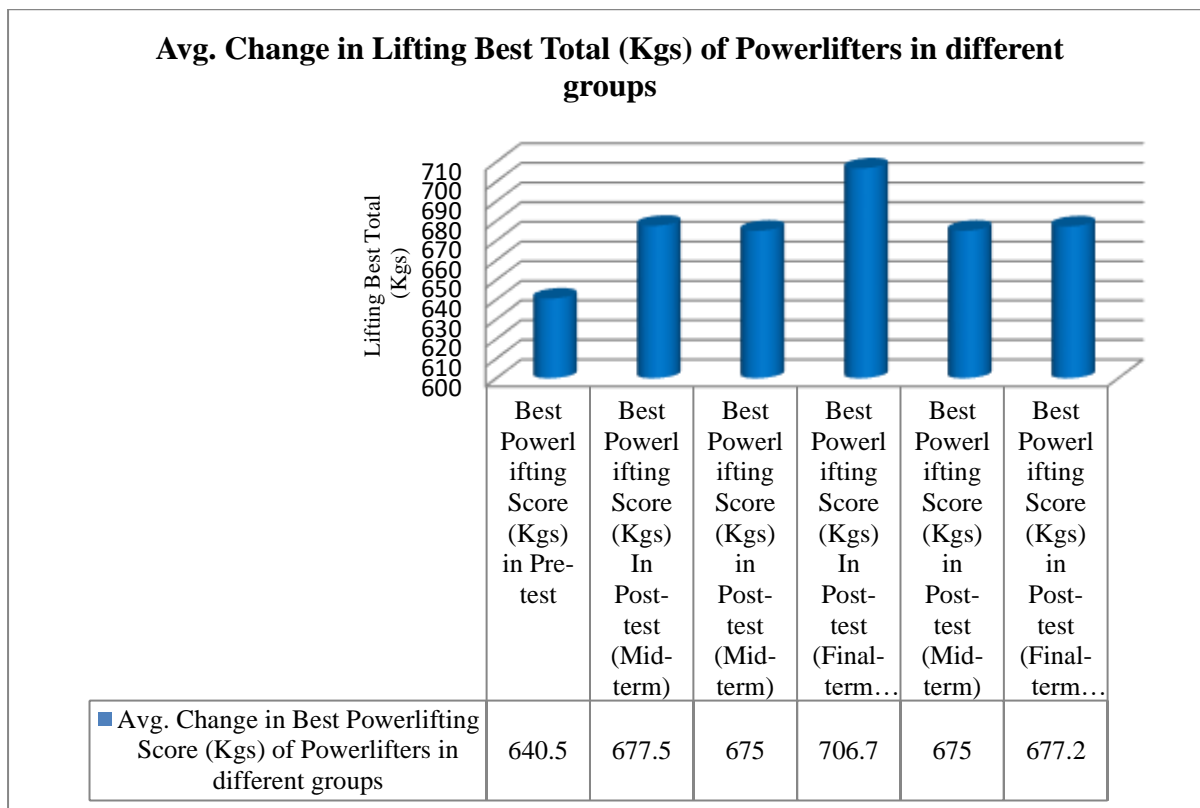


Figure 2



4. Discussion

Iron is a mineral that is absolutely necessary because it is necessary for the body to make hemoglobin, which carries oxygen to the muscles (Al-Fartusie & Mohssan, 2017). Adequate iron intake is necessary for optimal athletic performance, particularly in endurance sports, where oxygen delivery to the muscles is critical. However, for powerlifters who engage in strength training, the evidence for a direct link between iron supplementation and strength development is mixed (Schoenfeld, 2013). While iron deficiency can lead to fatigue and reduced physical performance, taking iron supplements above recommended levels can also have adverse effects on health and performance (Lukaski, 2004). It is essential to keep in mind that while getting enough iron is essential for overall health and well-being, taking in too much iron can cause toxicity and other negative health effects (Williamson, 2006). Therefore, powerlifters should aim to meet their daily iron requirements through a balanced diet that includes iron-rich foods such as lean meats, poultry, fish, beans, lentils, spinach, and fortified cereals (Rogerson, 2017). If a powerlifter suspects they have iron deficiency or anemia, they should consult a healthcare professional for proper diagnosis and treatment, which may or may not include iron supplementation (Twible, Baldwin & Breuner, 2020). Iron polymaltose complex (IPC) is a type of iron supplement that is commonly used to treat iron deficiency anemia (Rosli, Norhayati & Ismail, 2021). While IPC can be beneficial for individuals with iron deficiency, there is clear evidence that powerlifters must rely on IPC supplementation to develop strength (Madden, 2022). As Iron is an essential mineral that plays a

vital role in the production of hemoglobin, which transports oxygen to the muscles. However, excessive iron intake can be harmful and may cause toxicity (Soetan, Olaiya & Oyewole, 2010). Taking too much iron can lead to gastrointestinal issues, such as nausea and constipation, and can also lead to liver and heart damage (Gomes et al., 2018). The goal of this study was to measure the role of IPC on strength development of Powerlifters in Pakistan by increase in their blood hemoglobin level (g/dL) and lifting best total (Kgs) which were tested through the supplementation of IPC in two different patterns of pre-test to post-test (mid-term) and from post-test (mid-term) to post-test (final-term) for both experimental and control group and as a result found that increase both in their blood hemoglobin level and lifting best total due to supplementation of IPC which made both hypotheses as null hypotheses and validated the supplementation of IPC for Powerlifters in strength development.

5. Conclusion and Future Recommendations

Researchers concluded that supplementation of Iron Polymaltose Complex (IPC) has a positive effect on their blood hemoglobin level which may cause a positive effect on their lifting best total of three events of Powerlifting Sport (Squat, Benchpress and Deadlift) by increasing their 1RM for all three events of Powerlifting Sport. So, in order to generalize this research, this study should be done on larger population and female gender as well because female has more loss of blood in their menstrual cycle which may will give clear picture about the effect of IPC on their strength development and increase in lifting best total.

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